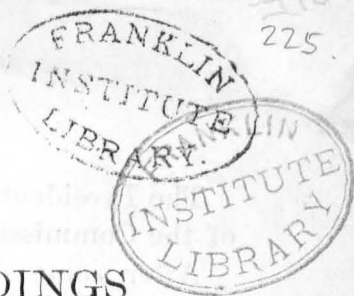


~~1. B. 302.~~
527-10.



FINAL PROCEEDINGS
OF THE
ADVISORY COMMISSION OF ENGINEERS
CONVENED BY
JAMES B. EADS,
TO CONSIDER HIS PLANS FOR THE IMPROVEMENT
OF THE
MOUTH OF THE MISSISSIPPI.

CCC
CORNEW
NN
DLC
JAN
Mo-Sr.L.
NCH
BROWN

PORT EADS, La., Nov. 18, 1875.

The commissioners, Gen. J. G. Barnard, Sir Charles A. Hartley, W. Milnor Roberts, Prof. Henry Mitchell and H. D. Whitcomb, assembled in New Orleans, November 15th, and proceeded to Port Eads on the 17th. After visiting the works in progress, the commission held a meeting at Port Eads on the 18th.

Present, Gen. J. G. Barnard, President, and Sir Charles A. Hartley, W. Milnor Roberts, Prof. Henry Mitchell and H. D. Whitcomb.

Communications were received from Gen. Alexander and Mr. Sickles stating that pressing engagements prevented their attending the meeting.

LMVC
TC
425
M65
A38
1875

The President read the minutes of the meeting of the Commissioners in New York in September.

After some discussion it was recommended by the board that the space of six hundred feet between the north end of the west jetty and the shore, across which piles are now driven and mattresses being laid, should not be closed until the east jetty shall have been raised to its full height out to twenty feet depth of water.

Mr. Eads having intimated to the board that it is of importance to himself and his associates that a depth of twenty feet should be obtained at the mouth of the South Pass as soon as possible, the board recommend, in consideration of Mr. Eads's representation, that provisional jetty heads one hundred feet in length be established in a depth of twenty feet in the line of both jetties, and that the construction of these works be in conformity with the cross section of a jetty presented by Mr. Eads.

This drawing indicates :

1. That the said jetty heads shall consist of stone and fascine work, having a width of 26 feet at the water line, with a slope of 3 to 1 on both sides to a depth of 16 feet.

2. That below this depth the base of the work shall have a width of 222 feet, and including revetment of stone, be 4 feet thick, thus giving an apron 50 feet wide at the foot of each slope.

3. That the apron and slopes shall have a revetment of stone at least 2 feet thick ; and

4. That the work be crowned with paving stones, weighing not less than 1 ton each, carried up to a height 4 feet above mean low water.

The board further recommend that the exposed sea ends of the temporary jetty heads should have the same inclination as the side slopes, it being understood that the bottom out to the depth of 30 feet in the proposed line of the east jetty is already covered with at least one layer of mattresses.

With reference to the permanent jetty heads, the board is of the opinion that their construction, as regards profile fascines, stones and piles, should be nearly as possible identical with that of the jetty heads at the new mouth of the Maas, where the stones employed in exposed positions averaged 120 pounds each, and where each cubic yard of mattress work was charged with half a ton of stone. The board also considers that a like covering of stone on the mattresses should be employed in constructing the jetties at the South Pass, wherever they are liable to be attacked by heavy seas.

The board then adjourned.

PORT EADS, Nov. 19, 1875.

The board met at 9 P. M. Present, same Commissioners as on the 18th. Present also, Mr. Eads. After conversation and discussion, the board adjourned without action to 9 A. M. the 20th.

PORT EADS, Nov. 20, 1875.

The board met according to adjournment. Present, the same members as on last evening.

The following letter was submitted to the board, and read, and ordered to be spread on the minutes. The personal examinations on the work made by

the board confirm the correctness of Mr. Corthell's statement :

“PORT EADS, Nov. 19, 1875.

“Mr. G. W. R. Bayley, Resident Engineer :

“*Dear Sir*—The following is a statement of work at this date :

“There have been driven as guide piles for mattresses about 2500 piles, extending on the east jetty to a point about 12,100 feet from east point signal, and about 11,500 from same point on west jetty—measured on jetty lines.

The length of foundation mattresses laid in East Jetty is.....	11,560 ft.
The length of second tier mattresses laid in East Jetty is....	2,850 “
The length of foundation mattresses laid in West Jetty is.....	8,200 “
The length of foundation mattresses laid in cross dike is.....	600 “
Total linear feet.....	23,210 *

“In which there are 75,000 cubic yards of material all firmly secured in its position by stone ballast. Sheet piling in the east jetty has been driven a length of 3,600 feet.

“There have been constructed 800 lineal feet of launching ways for mattresses. Houses and boats for the accommodation of 350 men have been placed on the west side of the Pass, and on the east side a large house for headquarters' residence has been built, and all the shops, walks and wharves necessary for works. The plant in the work consists of two floating pile drivers, three sheet pile drivers, five derricks, eight model barges, eight flats, two stern-wheel steamboats, two tugs, three steam launches, with yawls and other small boats.

*NOTE.—Equal to a length of four miles—fifty feet wide and two feet thick.

"At the head of the Passes about 200 piles have been driven on the line of the deflecting dike, and at the Jump 200 lineal feet of mattress ways have been constructed, with accommodations in each place for all the men required for the work.

I am sir, yours truly,

"E. L. CORTHELL,
Chief Assistant Engineer.

"Respectfully submitted to the Chief Engineer,
G. W. R. BAYLEY,
Resident Engineer."

Whilst the board appreciates the preparations made for carrying on the works with vigor, it is unanimously of opinion that a rapid delivery of stone on the works is essential to obtain a speedy depth on the bar, and for the protection of the jetties where they are exposed to the violence of the waves. It therefore directs Mr. Eads's special attention to this subject, with the suggestion that a deposit of at least 10,000 cubic yards of stone be piled on the river banks, near the mouth, as a reserve deposit to meet emergencies during the construction of the jetties in deep water.

NOVEMBER, 20, 1875.

The Commission adopted the following general report, and ordered it to be entered into the minutes of its proceedings.

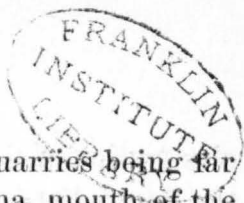
After having devoted three days to examining the works in progress and in conference with Mr. Eads and his engineers, the Commission presents the following general summary of its views:

Upon personal examination of the locality and

observation of the work which has been performed, the South Pass of the Mississippi is found by the Commission to more than fulfil the expectation of its members in regard to its fitness for furnishing an open mouth of ample depth for the largest class of sea-going vessels to the Mississippi River by means of jetties.

In making this statement reference must be had to the fact that two of the members have never before examined the locality with a view to this particular question, one indeed having never before visited the spot. Of course on all points concerning difficulties of execution of the works recommended, they had had no actual local experimental results, while on the other hand, opinions were rife among many that the local peculiarities of the soil, such as its extreme softness, its eruptive "mud lumps," etc., would effectually thwart efforts to lay upon it substantial and permanent engineering constructions.

The members of the Commission had, indeed, satisfied themselves that such opinions were unfounded; but it is satisfactory to be able to state positively, after four months of actual operations, that the work of pile-driving, extending from the east land's end to twenty-six feet depth beyond the bar crest, along a line two and a quarter miles in length, covering nearly the whole length of the eastern jetty, and an examination of the texture of the bar and of the shoals on which the works are to rest, furnish the most satisfactory evidence of a bottom material not only adequate to bear all the necessary works, but even to suggest



that but for motives of economy (quarries being far distant) the jetties, as at the Sulina mouth of the Danube, might be made wholly of stone. The Commission therefore unhesitatingly announces that the supposed or attributed engineering difficulties of construction of engineering works at the South Pass of the Mississippi as depending on peculiarities of the Mississippi delta are illusory.

In fact, the execution of the works is far less difficult than that of several recent successful works of the kind on European shores, known to and examined by the members of the Commission. This facility of execution arises, in a measure from the fact that the broad, lateral shoals, almost bare at low water, which extend seaward from the land's ends, marginal to the channel, form very good protection to the proposed works and almost reduce them to the grade of mere river works until the outer edge of the bar is reached. The deep water portions, outside of the bar of the proposed jetties, are comparatively short. While these portions must have the dimensions and strength of exposed sea works, they offer no difficulty not common to other similarly exposed works now existing.

It would seem proper in this connection to say a few words as to the South Pass itself, in reference to its capabilities to furnish an open mouth to the main stream, and thus form an adequate connection between the sea and the thirty thousand miles of inland navigation, which ramify from the river.

The South Pass is the middle one of three great passes, into which the river, after having for many hundred miles rolled in a single channel, divides a

few miles before it finally discharges its waters into the Gulf of Mexico.

It is but twelve miles long, being the shortest of the passes. From its point of division it carries its waters in a channel everywhere five fathoms or more in depth, with a straightness of course and a uniformity of section and depth such as almost to suggest to the voyager that he is navigating a canal of unparalleled dimensions, of a width averaging 700 feet, sufficient for the convenient transit of the largest sea-going ships, and of the congeries of vessels which constitute a tow for the powerful tug-boats in use. No sharp bend, no shoal, no reef, embarrasses its navigation.

At the origin—the head of the Passes—a shoal indeed lies in advance of its entrance. This shoal has, however, a natural depth equal to that over the bar at Southwest Pass, and the Commission anticipates no serious difficulty in effecting over it the required depth. From this point the adequacy of depth continues unbroken for ten miles till the seaward extremities of the land margins (the natural jetties which thus far maintain it) are reached. Here released from confinement, the current diffuses itself; the depth diminishes until at two miles further (about) the bar, having but seven feet depth, is reached; beyond which, seaward, depths of 6, 12, 24 and more fathoms are found in quick succession. The specific engineering work which the Government of the United States has committed to Mr. Eads is by the well known method of jetties or otherwise called parallel piers, to supply artificially throughout this two miles from the land's

ends to the outer slope of the bar the confining barriers which shall prolong to the sea the uniformity of section and depth which the natural barriers for the preceding ten miles have secured.

This is not the place to discuss the abstract merits of a well known method which has elsewhere in reference to its application here, been thoroughly discussed and disposed of, and in which the individual members of the Commission have had each one his own part to take. What has been said in former paragraphs suffices to exhibit the strengthened confidence with which personal examination of the spot and of the works now in progress has imbued the members of the Commission.

The Commission considers the present an opportune moment to record its opinion. First, that the physical characteristics of the delta and bars of the Mississippi and Danube, are similar in many important respects. And secondly, that owing to the greater sea depth immediately beyond the crest of its bar, to the existence of tide-water, to the apparent greater abrading forces along the coast, and to the extreme fineness of the sand of which the bar is composed, the mouth of the South Pass of the Mississippi is *more* susceptible of successful improvement, notwithstanding the greater turbidity of its fluvial current, than was the Sulina mouth of the Danube, when in 1858 the construction of parallel piers was commenced which secured to the navigation of that river a depth of $17\frac{1}{2}$ feet in 1861 and $20\frac{1}{2}$ feet at the present time, or five feet more than the works were originally designed to obtain; and this at the mouth of a river-arm discharging less

than one-third of the volume of water discharged by the South Pass.

We now turn to the works actually at this time executed by the grantee, Mr. Jas. B. Eads, under the act of Congress authorizing him to improve the South Pass of the Mississippi River, and we find that they have been laid out and thus far carried on substantially in accordance with the plans submitted to and approved by this Commission at the time of their session in September last.

Considering that only the short period of five months has elapsed since the beginning of operations at the South Pass, we are struck with the amount of work which has been accomplished; and although much that has been done is provisional, to be supplemented by other work, it is all necessary and conducive to the end in view, which is permanently to confine the flow within the space of one thousand feet between the crests of the jetties.

We find from the records of the pile driving, and from the manner in which the piles have thus far withstood the action of the waves and currents, that the material of the bar is even more solid than we had ventured to anticipate it would be, as we have already remarked. We do not entertain any doubt as to the efficiency and permanency of the jetties, when they shall have been completed upon the location and plans heretofore approved by this Commission. If the arrangements made by the contractors, Messrs. James Andrews & Co., for the early delivery of additional large quantities of stone for weighting the mattresses, and for the pro-

tection of the jetties against the action of the sea, are successfully executed, we see no reason for doubting the realization of definite and permanent good results at an early date.

It is hardly within our province, if it were even in our power to offer any specific opinion respecting the period when a given depth across the bar may be reliably calculated upon since so much necessarily depends upon the character of the season, the stage of water in the river, and the vigor with which the works are prosecuted ; but judging from the amount and character of the work already accomplished in advance of the date at which Congress required it to begin, we are very favorably impressed, believing that there is a prospect of early and complete success.

The lines of the jetties are now distinctly marked out by the rows of piles extending seaward on the east side beyond the crest of the bar into twenty-six feet of water, and on the west side to about twenty feet depth, indicating the extent and shape of the new entrance.

While it would have been unreasonable to have anticipated at this early period in the progress of this important undertaking even as much as has already been effected, we desire to be careful lest we should ourselves undervalue or cause others to view lightly the difficulties which yet remain to be overcome before the final grand result shall have been attained.

Care should be exercised to strengthen the works already commenced, in order to enable them to resist the gales of winter ; and too much haste to call

in the river forces for the execution of deepening must be avoided. It is much safer, while the foundations of the jetties are insufficiently protected by stone, to allow the present escape of water by lateral avenues.

From what has already been said, it will have been clearly enough seen that the Commission did not expect at this early stage in the progress of the work that much scouring effects would have been produced. Such results cannot be expected to exhibit themselves in a very marked manner until, by the closure of the opening (600 feet in length) at the head of the west jetty, and by the raising of both the parallel piers to the water surface throughout some considerable length, the water shall be confined to its destined channel. From the eastern land's end to near the head of the west jetty the eastern jetty is now for the most part thus raised, while the west bank itself imperfectly fulfils the function of its parallel pier. Throughout this length—say for 4,400 feet—a marked scouring effect has taken place.

At this season of the year, when the river is low, the scouring action of the current is reduced to its minimum. This while it is the least favorable to the exhibition of results from the jetty works thus far executed, is the most favorable to their safe and rapid construction. It is quite undesirable that any considerable deepening of the bar should occur before the spring shall find the works in a condition to resist and turn to useful account the flood that may then be expected.

On motion :

Resolved, That a copy of the minutes and of the foregoing resumé be furnished to Mr. Eads by the Secretary.

Whereupon the Commission adjourned *sine die*.

J. G. BARNARD, President.

CHARLES A. HARTLEY,

W. MILNOR ROBERTS,

HENRY MITCHELL,

H. D. WHITCOMB.

A true copy from the minutes.

H. D. WHITCOMB, Secretary.